United States Department of Energy

Savannah River Site



SEP 12 2002

DIVISION OF SITE ASSESSMENT & REMEDIATION

Record of Decision Remedial Alternative Selection for the R-Area Acid/Caustic Basin (904-77G) (U)

WSRC-RP-2002-4015

Revision 1

July 2002

Prepared by:
Westinghouse Savannah River Company LLC
Savannah River Site
Aiken, SC 29808



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Prepared for
U.S. Department of Energy
and
Westinghouse Savannah River Company LLC
Aiken, South Carolina

RECORD OF DECISION REMEDIAL ALTERNATIVE SELECTION (U)

R-Area Acid/Caustic Basin (904-77G) (U)

WSRC-RP-2002-4015 Revision 1

July 2002

Savannah River Site Aiken, South Carolina

Prepared by:

Westinghouse Savannah River Company LLC
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DECLARATION FOR THE RECORD OF DECISION

R-Area Acid/Caustic Basin (904-77G)

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: OU-72

Location: Barnwell County, South Carolina

Site Name: Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

Identification Number: SC1 890 008 989

Site Owner: United States Department of Energy

The R-Area Acid/Caustic Basin (904-77G) Operable Unit (OU) (RAACB) is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS). The RAACB OU is situated within the Future Industrial (Nuclear) zone at SRS (USDOE 1996), and has been designated as such due to its proximity to other industrial areas and its location at the site interior at a considerable distance from any site boundaries. The environmental media associated with the RAACB are surface soil, subsurface soil, and groundwater. The RAACB consists of four subunits: (1) R-Area Acid/Caustic Basin, (2) Inactive Process Pipeline, (3) Overflow Drainage Ditch, and (4) groundwater.

Statement of Basis and Purpose

Residential and industrial land use were assumed in the risk evaluation performed in the RCRA Facility Investigation/Remedial Investigation Work Plan Addendum with Risk Evaluation Report (WSRC 2001a). Based on this risk evaluation, the RAACB OU poses no risk to human health (future resident, future industrial worker, and current industrial worker) and the environment. An evaluation of remedial alternatives is not necessary since no remedial action is required to ensure protection of human health and the environment. This decision is based on the Administrative Record File for this site.

The State of South Carolina concurs with the selected remedy.

Description of the Selected Remedy

The selected remedy for the RAACB OU is No Action. Therefore, no CERCLA action is necessary for the OU. The South Carolina Department of Health and Environmental Control (SCDHEC) has modified the Savannah River Site RCRA Permit to incorporate the No Action remedy for the RAACB OU.

Statutory Determinations

The RAACB OU is situated within the Future Industrial (Nuclear) zone at SRS (USDOE 1996), and has been designated as such due to its proximity to other industrial areas and its location at the site interior at a considerable distance from any site boundaries. Based on the RAACB OU RCRA Facility Investigation/Remedial Investigation Work Plan Addendum with Risk Evaluation Report, no action is necessary at the RAACB OU to ensure the protection of human health and the environment. Because the RAACB OU poses no risk to human health (future resident, future industrial worker, and current industrial worker) and the environment and no action is required, the CERCLA Section 121 requirements are not applicable. The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is meant to be a permanent solution, and final action, for the RAACB OU.

Section 300.430(f)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan requires that a five-year review of the Record of Decision (ROD) be performed if hazardous substances, pollutants, or contaminants remain at the OU. Because the hazardous substances, pollutants, or contaminants remaining at the RAACB OU will be at or below acceptable levels, the United States Environmental Protection Agency (USEPA), SCDHEC, and the United States Department of Energy (USDOE) have determined that a five-year review of the ROD for the RAACB will not be required.

7/02

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Date

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DECISION SUMMARY REMEDIAL ALTERNATIVE SELECTION (U)

R-Area Acid/Caustic Basin (904-77G)

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR applicable or relevant and appropriate requirement

bgs below ground surface

CERCLA Comprehensive Environmental Response, Compensation and

Liability Act

CERCLIS Comprehensive Environmental Response, Compensation, and

Liability Information System

CMS/FS corrective measures study/feasibility study

COC constituent of concern
CSM conceptual site model
FFA Federal Facility Agreement

ft feet km kilometer

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LLC Limited Liability Company
LLTSM low level threat source material

m meter

MCL maximum contaminant level

mi mile

NCP National Oil and Hazardous Substances Pollution Contingency Plan

NEPA National Environmental Protection Act

OU operable unit

PCB polychlorinated biphenyl
PTSM principal threat source material
RAACB R-Area Acid/Caustic Basin

RCRA Resource Conservation and Recovery Act

RFI RCRA Facility Investigation
RI Remedial Investigation
ROD Record of Decision

SARA Superfund Amendments Reauthorization Act

SB/PP Statement of Basis/Proposed Plan

SCDHEC South Carolina Department of Health and Environmental Control SCHWMR South Carolina Hazardous Waste Management Regulations

SRS Savannah River Site

USDOE United States Department of Energy

USEPA United States Environmental Protection Agency

WPA Work Plan Addendum

WSRC Westinghouse Savannah River Company LLC

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I. SAVANNAH RIVER SITE AND OPERABLE UNIT NAME, LOCATION, AND DESCRIPTION

Unit Name, Location, and Brief Description

R-Area Acid/Caustic Basin (904-77G)

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number: OU-72

Location: Barnwell County, South Carolina

Site Name: Savannah River Site

Comprehensive Environmental Response, Compensation and Liability Act

(CERCLA) Identification Number: SC1 890 008 989

Site Owner: United States Department of Energy (USDOE)

The Savannah River Site (SRS) occupies approximately 803 km² (310 mi²) of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of South Carolina (Figure 1). SRS is located approximately 40 km (25 mi) southeast of Augusta, Georgia, and 32 km (20 mi) south of Aiken, South Carolina.

The USDOE owns SRS, which historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes are byproducts of nuclear material production processes. Hazardous substances, as defined by the CERCLA, are currently present in the environment at SRS.

The Federal Facility Agreement (FFA) for the Savannah River Site (FFA 1993) lists the R-Area Acid/Caustic Basin (904-77G) Operable Unit (OU) (RAACB) as a Resource Conservation and Recovery Act Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (RCRA/CERCLA) unit requiring further evaluation. The RAACB OU was evaluated through a process that integrated and combined the RCRA Facility Investigation (RFI) process with the CERCLA remedial investigation (RI) process

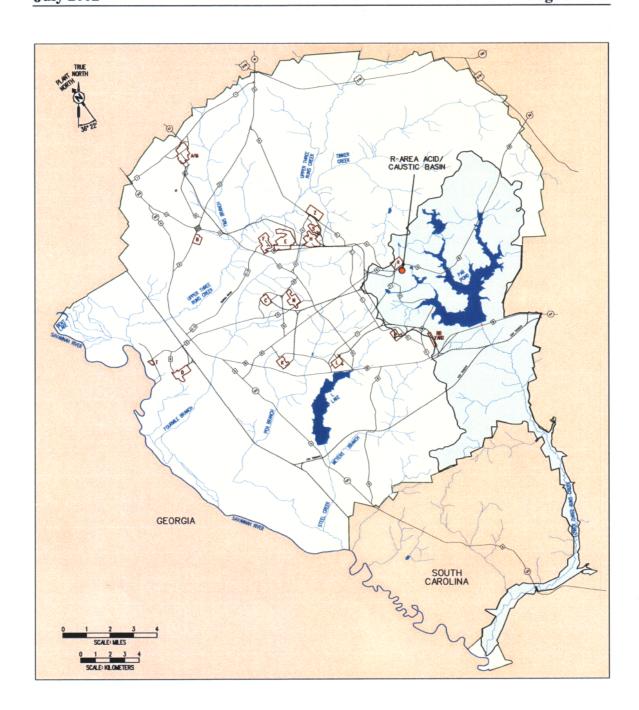


Figure 1. Location of the RAACB OU in the Lower Three Runs Watershed at SRS

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to determine the actual or potential impact to human health and the environment of releases of hazardous substances to the environment.

II. SITE AND OPERABLE UNIT COMPLIANCE HISTORY

SRS Operational and Compliance History

The primary mission of SRS has been to produce tritium, plutonium, and other special nuclear materials for our nation's defense programs. Production of nuclear materials for the defense program was discontinued in 1988. SRS has provided nuclear materials for the space program, as well as for medical, industrial, and research efforts up to the present time. Chemical and radioactive wastes are byproducts of nuclear material production processes. These wastes have been treated, stored, and in some cases, disposed at SRS. Past disposal practices have resulted in soil and groundwater contamination.

Hazardous waste materials handled at SRS are managed under RCRA, a comprehensive law requiring responsible management of hazardous waste. Certain SRS activities require South Carolina Department of Health and Environmental Control (SCDHEC) operating or post-closure permits under RCRA. SRS received a RCRA hazardous waste permit from the SCDHEC, which was most recently renewed on September 5, 1995. Module IV of the Hazardous and Solid Waste Amendments portion of the RCRA permit mandates corrective action requirements for non-regulated solid waste management units subject to RCRA 3004(u).

On December 21, 1989, SRS was included on the National Priorities List. The listing created a need to integrate the established RFI program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA 42 U.S.C.A. 9620, USDOE has negotiated a FFA (FFA 1993) with United States Environmental Protection Agency (USEPA) and

SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy that fulfills these dual regulatory requirements. USDOE functions as the lead agency for remedial activities at SRS, with regulatory oversight by the USEPA - Region IV and the SCDHEC.

Operable Unit Operational and Compliance History

The RAACB OU consists of the following four subunits:

- 1. R-Area Acid/Caustic Basin,
- 2. Inactive Process Pipeline,
- 3. Overflow Drainage Ditch, and
- 4. Groundwater.

Investigations conducted at the RAACB OU included soil sampling and analysis, installing four groundwater monitoring wells, and analyzing groundwater samples collected from the wells. There have been no site remediation actions performed in the OU. Figures 2 and 3 are maps of the OU; Figures 4 and 5 are ground-level photographs of the R-Area Acid/Caustic Basin.

The assessment and characterization activities at the RAACB OU are documented in a series of reports written by USDOE and approved by the regulatory agencies (SCDHEC and USEPA). These documents include the:

- RFI/RI Work Plan for the R-Area Acid/Caustic Basin (904-77G) (U) (WSRC 1999),
- RFI/RI Work Plan Addendum (WPA) with Risk Evaluation for the R-Area Acid/Caustic Basin (904-77G) (U) (WSRC 2001a), and
- Statement of Basis/Proposed Plan (SB/PP) for the R-Area Acid/Caustic Basin (904-77G) OU (U) (WSRC 2001b).

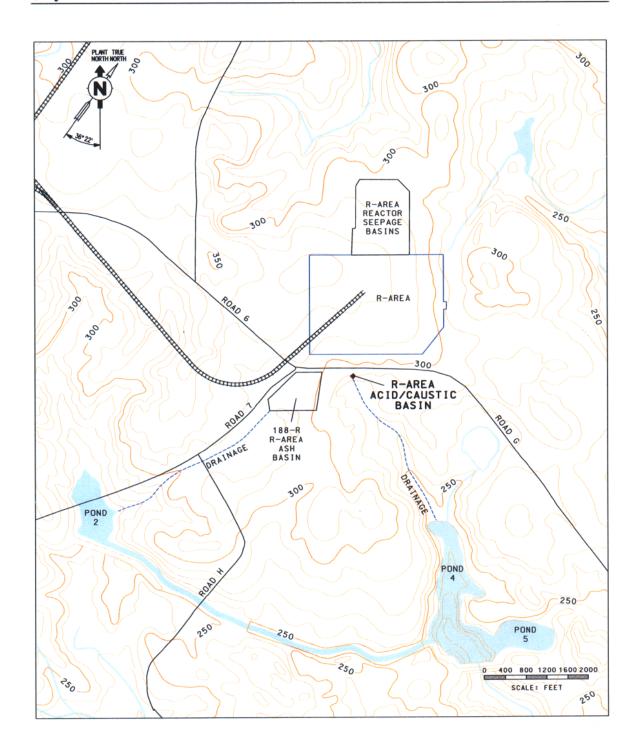


Figure 2. Map of R Area and the RAACB OU

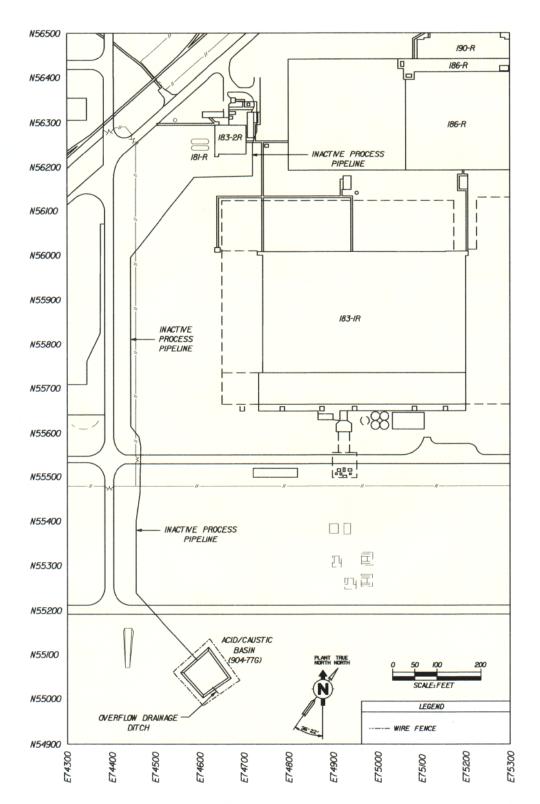


Figure 3. Map Showing the Inactive Process Pipeline, RAACB, and Overflow Drainage Ditch



Figure 4. Photograph of RAACB OU looking west Note: Photograph taken in Fall 1998. The basin is located beyond the orange marker and fenceline.



Figure 5. Close-up Photograph of RAACB looking west-northwest Note: Photograph taken in Fall 1998.

Preliminary results indicated that the RAACB OU did not have any refined constituents of concern (COCs). Therefore, an agreement was made between WSRC and the USEPA, USDOE, and SCDHEC to proceed with a Work Plan Addendum (WPA) with Risk Evaluation in place of the RFI/RI/BRA. Additionally, a corrective measures study/feasibility study (CMS/FS) was not prepared because the RAACB OU WPA with Risk Evaluation did not identify any refined COCs. The USEPA, USDOE, and SCDHEC agreed that SRS could proceed directly to production of the SB/PP.

R-Area Acid/Caustic Basin

The RAACB is an unlined earthen basin approximately 15.2 m (50 ft) wide, 15.2 m (50 ft) long, and 2.1 m (7 ft) deep. The RAACB was excavated in 1952 and operated from 1954 until it was deactivated in 1964. The basin has since been filled with clean soil. The basin received spent dilute sulfuric acid and sodium hydroxide solutions used to regenerate ion-exchange units in reactor water treatment facilities. Spent acid and caustic solutions were discharged to the acid/caustic basin via the inactive process pipeline. Based on the process history and data from other acid/caustic basins, the potential basin contaminants were arsenic, barium, chromium, lead, and mercury.

Soil sampling was conducted at the RAACB in 1985, as part of a program to define the extent of potential chemical contamination in the acid/caustic basins at SRS. In 1999, additional soil sampling was conducted within, and adjacent to, the basin. No analytes were detected at concentrations exceeding applicable or relevant and appropriate requirement (ARAR) screening values or acceptable risk and/or hazard levels for unrestricted land use.

Inactive Process Pipeline

The inactive process pipeline was constructed in 1952 at approximately the same time the RAACB was built. The pipeline was comprised of 457 m (1,500 ft) of gravity-flow process line that connected the water purification facilities in R Area to the RAACB. The pipeline was buried; the depth to the bottom of the line ranges from 1.3 m (4.3 ft) to 4.1 m (13.5 ft) below ground surface (bgs).

In 1999, soil samples were collected adjacent to manholes along the pipeline. No analytes were detected at concentrations exceeding ARAR screening values or acceptable risk and/or hazard levels for unrestricted land use.

Overflow Drainage Ditch

An overflow weir on the rim of the basin was used to limit the depth of the water in the basin to about 0.76 m (2.5 ft). Water flowing through the weir was conveyed through the overflow drainage ditch, which is about 5.5 m (18 ft) long and 1.7 m (5.7 ft) below surrounding grade. The water subsequently flowed as runoff through surface drainage to Pond 4, located about 1.2 km (0.75 mi) southeast of the RAACB OU (Figure 2).

In 1999, soil sampling was conducted along the overflow drainage ditch. No analytes were detected at concentrations exceeding ARAR screening values or acceptable risk and/or hazard levels for unrestricted land use.

Groundwater

Four monitor wells were installed at the RAACB OU in 1983 and 1984 (RAC-1, -2, -3, and -4). The total depths of the wells range in depth from 11.1 to 12.4 m (36.5 to 40.8 ft) bgs. No analytes have been detected in groundwater samples collected from the wells at concentrations exceeding Safe Drinking Water Act maximum contaminant levels (MCLs).

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Both RCRA and CERCLA require that the public be given an opportunity to review and comment on the permit modification and proposed remedial Public participation requirements are listed in South Carolina alternative. Hazardous Waste Management Regulation (SCHWMR) R.61-79.124 and Sections 113 and 117 of CERCLA 42 U.S.C.A 9613 and 9617. requirements include the establishment of an Administrative Record File to document the site investigation and selection of the remedial alternative. The Administrative Record File must be established at or near the facility at issue. The SRS Public Involvement Plan (USDOE 1994) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. The SRS Public Involvement Plan addresses the requirements of RCRA, CERCLA, and the National Environmental Policy Act (NEPA). SCHWMR R.61-79.124 and Section 117(a) of CERCLA, as amended, require the advertisement of the permit modification and notice of any proposed remedial action and provide the public an opportunity to participate in the The SB/PP (WSRC 2001b), a part of the selection of the remedial action. Administrative Record File, highlights key aspects of the investigation and identifies the preferred action for addressing the RAACB OU.

The FFA Administrative Record File, which contains the information pertaining to the selection of the response action, is available for public review at the following locations:

US Department of Energy Public Reading Room Gregg-Graniteville Library University of South Carolina – Aiken 171 University Parkway Aiken, South Carolina 29801 (803) 641-3465 Thomas Cooper Library Government Documents Department University of South Carolina Columbia, South Carolina 29208 (803) 777-4866 The RCRA Administrative Record File for SCDHEC is available for review at the following locations:

The South Carolina Department of Health and Environmental Control Bureau of Land and Waste Management 8901 Farrow Road Columbia, South Carolina 29203 (803) 896-4000 Lower Savannah District Environmental Quality Control Office 206 Beaufort Street, Northeast Aiken, South Carolina 29801 (803) 641-7670

The public was notified of the public comment period through mailings of the SRS Environmental Bulletin, a newsletter sent to citizens in South Carolina and Georgia, and through notices in the Aiken Standard, the Allendale Citizen Leader, the Augusta Chronicle, the Barnwell People-Sentinel, and The State newspaper. The public comment period was also announced on local radio stations.

The SB/PP 45-day public comment period began on December 20 and ended on February 3, 2002. No public comments were received.

IV. SCOPE AND ROLE OF THE OPERABLE UNIT WITHIN THE SITE STRATEGY

RCRA/CERCLA Programs at SRS

RCRA/CERCLA units (including the RAACB) at SRS are subject to a multistage RI process that integrates the requirements of RCRA and CERCLA as outlined in the FFA (FFA 1993). The RCRA/CERCLA processes are summarized below:

- investigation and characterization of potentially impacted environmental media (such as soil, groundwater, and surface water) comprising the waste site and surrounding areas;
- 2. evaluation of risk to human health and the local ecological community;

- 3. screening of possible remedial actions to identify the selected technology which will protect human health and the environment;
- 4. implementation of the selected alternative;
- 5. documentation that the remediation has been performed competently; and
- 6. evaluation of the effectiveness of the technology.

The steps of this process are iterative in nature, and include decision points that require concurrence between USDOE as owner/manager, USEPA and SCDHEC as regulatory oversight agencies, and the public (see Figure 6). Because no preliminary media assessment results were above action levels, the RFI/RI/BRA was not required for the RAACB OU. Therefore, a WPA with Risk Evaluation was performed (see Figure 6), which established that there is no risk at the OU. Thus, No Action is the logical remedial strategy.

Operable Unit Remedial Strategy

The regulatory agencies concur with the determination that: (1) a No Action alternative is the appropriate remedy for the RAACB OU, (2) no remedial action will be conducted, and (3) no OU-specific institutional controls are required. The No Action alternative will be the final action for the RAACB OU.

V. OPERABLE UNIT CHARACTERISTICS

The RAACB OU is located near the center of SRS, approximately 8 km (5 mi) from the nearest site boundary. The unit is south of the R-Area Reactor and approximately 30.5 m (100 ft) south of SRS Road G. As referenced earlier, Figures 2 and 3 are maps of the OU, and Figures 4 and 5 are ground-level photographs of the RAACB OU.

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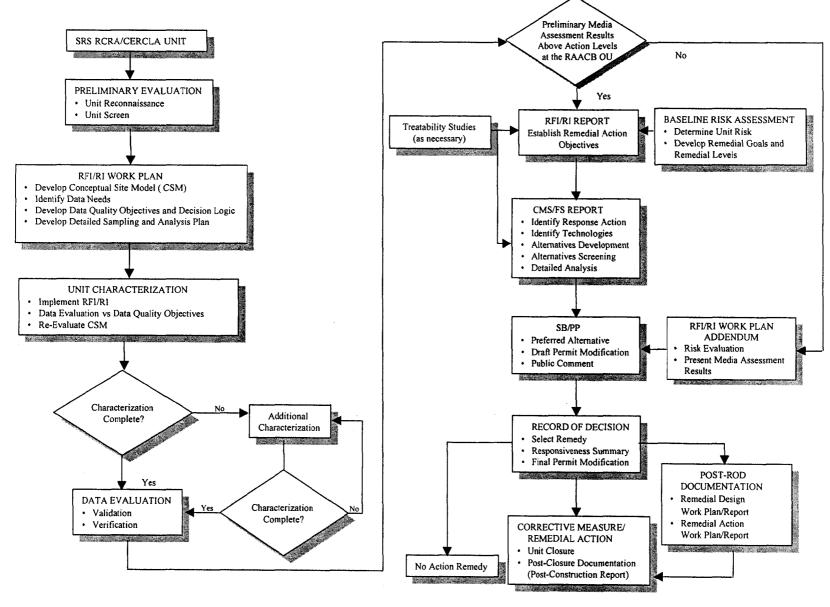


Figure 6. RCRA/CERCLA logic and documentation

Conceptual Site Model (CSM) for the RAACB OU

The CSM for the RAACB OU is presented as Figure 7. The emphasis is on pathways by which contaminants, if present, could migrate from the sources to receptors. As shown on the CSM, the primary sources of contamination are the dilute sulfuric acid and sodium hydroxide that were formerly discharged into the basin via the inactive process pipeline. Possible migration pathways include deposition in the basin and drainage ditch from basin discharge, infiltration into surface soil, subsurface soil, and groundwater, volatilization into ambient air, and resuspension of particulates. An additional migration pathway includes infiltration into the subsurface through pipeline leaks and/or deterioration.

Contact with contaminated environmental media creates exposure pathways for both human and ecological receptors. At the RAACB OU, these media include ambient air, surface soil, and subsurface soil. Potential receptors include the current on-unit worker, future industrial worker, and future child/adult residents. Ecological receptors include terrestrial organisms such as invertebrates, birds, reptiles, and mammals.

Media Assessment

Soil Investigation

Soil sampling was conducted at the RAACB in 1985 as part of a program to define the extent of potential chemical contamination in the acid/caustic basins at SRS. In 1999, soil samples were collected within the basin, adjacent to manholes along the inactive process pipeline, and along the overflow drainage ditch. In the RAACB OU WPA with Risk Evaluation (WSRC 2001a), the analytical results were compared to ARAR screening values or acceptable risk and/or hazard levels.

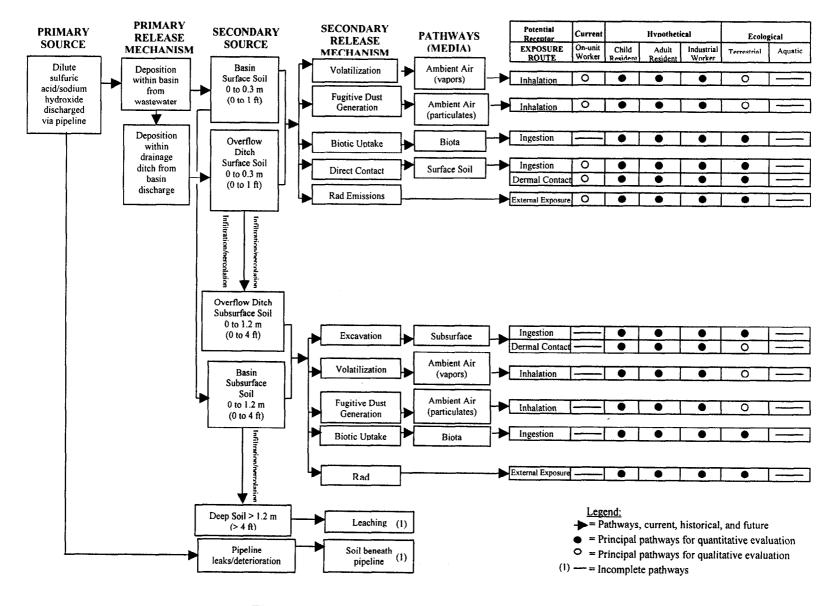


Figure 7. Conceptual Site Model for the RAACB OU

Groundwater Investigation

Groundwater samples have been collected from the four groundwater monitor wells at the RAACB OU for over 13 years. In the RAACB OU WPA with Risk Evaluation (WSRC 2001a), the most recent sampling data (1999 through 2000) were compared to MCLs.

Media Assessment Results

Soil and groundwater samples were analyzed for inorganic and organic compounds, pesticides, polychlorinated biphenyls (PCBs), and/or radionuclides. Based on evaluations in the RAACB OU WPA with Risk Evaluation (WSRC 2001a), no analytes were detected at concentrations exceeding ARAR screening values or acceptable risk and/or hazard levels for unrestricted land use. Additionally, no analytes have been detected in groundwater samples collected from the wells at concentrations exceeding Safe Drinking Water Act MCLs.

Contaminant Transport Analysis

A contaminant fate and transport analysis was performed in the RAACB OU WPA with Risk Evaluation (WSRC 2001a). No contaminant migration COCs were identified for the RAACB OU.

VI. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

The RAACB OU is located near the center of SRS, approximately 8 km (5 mi) from the nearest site boundary. The unit is south of the R-Area Reactor and approximately 30.5 m (100 ft) south of SRS Road G. The RAACB OU is located in the industrial area of R Reactor, one of several inactive nuclear reactors at SRS. In the Savannah River Site: Future Use Project Report (USDOE 1996), the USDOE has taken steps to prohibit residential use of SRS, including the vicinity

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of the R Reactor, through its plan for current and future use of the SRS. Therefore, future residential use and potential residential water use in the area are not anticipated.

The RAACB OU is situated within the Future Industrial (Nuclear) zone at SRS (USDOE 1996), and has been designated as such due to its proximity to other industrial areas and its location at the site interior at a considerable distance from any site boundaries.

Groundwater Uses/Surface Water Uses

Threatened or affected resources include soil and groundwater in the vicinity of the RAACB OU. Lower Three Runs and its associated wetlands are not threatened. There are no water-supply wells or other potential drinking water sources near the OU.

VII. SUMMARY OF OPERABLE UNIT RISKS

In place of the RFI/RI/BRA (see Figure 6), a Risk Evaluation was performed to evaluate risks and hazards associated with the OU and documented in the RFI/RI WPA. The Risk Evaluation included human health and ecological assessments using data collected since 1999. The evaluation included quantitative estimates of human health risks, ecological risks, and the threat posed by future leaching to groundwater.

Residential and industrial land use were assumed in the risk evaluation for the RFI/RI WPA with Risk Evaluation for the RAACB OU. This evaluation indicated that: (1) the RAACB OU poses no unacceptable current or future risk or hazard for humans or the environment, and (2) leaching to groundwater is not a concern. The results of the risk assessments are summarized in the following paragraphs.

Summary of Human Health Risk Assessment

The risk evaluation did not identify any COCs or human health risks to current or future industrial workers, or health risks under a potential future residential land use scenario.

Summary of Ecological Risk Assessment

The results of the ecological risk evaluation indicated that there are no COCs or risk to ecological receptors.

Risk Assessment Summary

Residential and industrial land use were assumed in the risk evaluation for the RFI/RI WPA with Risk Evaluation for the RAACB OU. As described in the RAACB OU WPA with Risk Evaluation (WSRC 2001a), the RAACB OU poses no unacceptable current or future risk or hazard for humans or the environment and that leaching to groundwater is not a concern. No refined human health COCs or final ecological constituents of potential concern have been retained for soils at the basin, inactive process pipeline, or overflow drainage ditch. Additionally, no ARAR COCs, principal threat source material (PTSM) COCs, or contaminant migration COCs have been retained, and groundwater analytes did not exceed their respective MCLs.

Conclusion

Residential and industrial land use were assumed in the risk evaluation for the RFI/RI WPA with Risk Evaluation for the RAACB OU. The risk evaluations and contaminant fate and transport analysis conclude that there is no contamination above action levels. Therefore, there are no problems warranting action associated with ARARs, PTSM, human health risks, ecological risk, or contaminant migration at the RAACB OU. Therefore, the RAACB OU poses no

current or future risk or hazard for humans or wildlife, and no remedial action is necessary to ensure protection of human health and the environment.

VIII. EXPLANATION OF SIGNIFICANT CHANGES

There are no changes to the selected remedy from the preferred alternative identified in the Statement of Basis/Proposed Plan.

IX. RESPONSIVENESS SUMMARY

No public comments were received during the public comment period. Therefore, a Responsiveness Summary was not required.

X. POST-ROD DOCUMENT SCHEDULE AND DESCRIPTION

No remedial action will be performed at the RAACB OU; therefore, a schedule for post-ROD cleanup activities is not required.

XI. REFERENCES

FFA, 1993. Federal Facility Agreement for the Savannah River Site, Administrative Docket No. 89-05-FF (Effective Date: August 16, 1993)

USDOE, 1994. Public Involvement, A Plan for the Savannah River Site, Savannah River Operations Office, Aiken, SC

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